

NASA TECH BRIEF

John F. Kennedy Space Center



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RF Antenna-Pattern Visual Aids for Field Use

The problem:

Antenna-field patterns are expressed graphically as a set of contour plots or plots of numerical-gain values, sometimes known as radiation-distribution patterns. During the installation of antennas in the field, these graphs are used as aids to visualize the actual antenna patterns on location. Unfortunately, these graphs are two-dimensional and are often difficult to visualize in three dimensions.

The solution:

Hand-held visual aids can be prepared for two- and three-dimensional antenna patterns for convenient use in the field.

How it's done:

Two-dimensional visual aids are applicable on flat terrain for establishing point-to-point communications links. They are prepared from the standard plot of an antenna-radiation pattern. First, the horizontal antenna

pattern is plotted on a standard polar-coordinate sheet (see Figure 1). Next, a transparency of this plot is made. Edges of this transparency are then stiffened with regular wire, cardboard, or molded plastic. With this accomplished, the visual aid is ready for field use.

Three-dimensional visual aids are helpful in setting up the nonhorizontal communications links in mountainous terrains. To prepare the aid, a series of plots must be made of the antenna pattern, again on polar-coordinate sheets, but this time depicting the vertical planes (see Figure 2). Separate sheets are plotted depicting antenna patterns in the vertical plane at the 0° , 30° , -30° , 60° , -60° ; and 90° , -90° azimuth positions. In most cases, it is best to use a half plane or half sheet for each azimuth position, because the patterns are asymmetrical.

After all the polar plots are drawn, they are labeled according to their azimuthal positions. Transparencies of each sheet then are prepared and assembled, as shown in Figure 2.

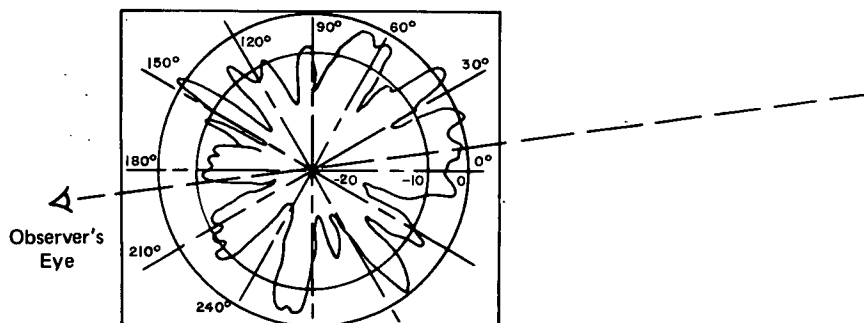


Figure 1. Two-Dimensional Horizontal Antenna-Radiation-Pattern Model

(continued overleaf)

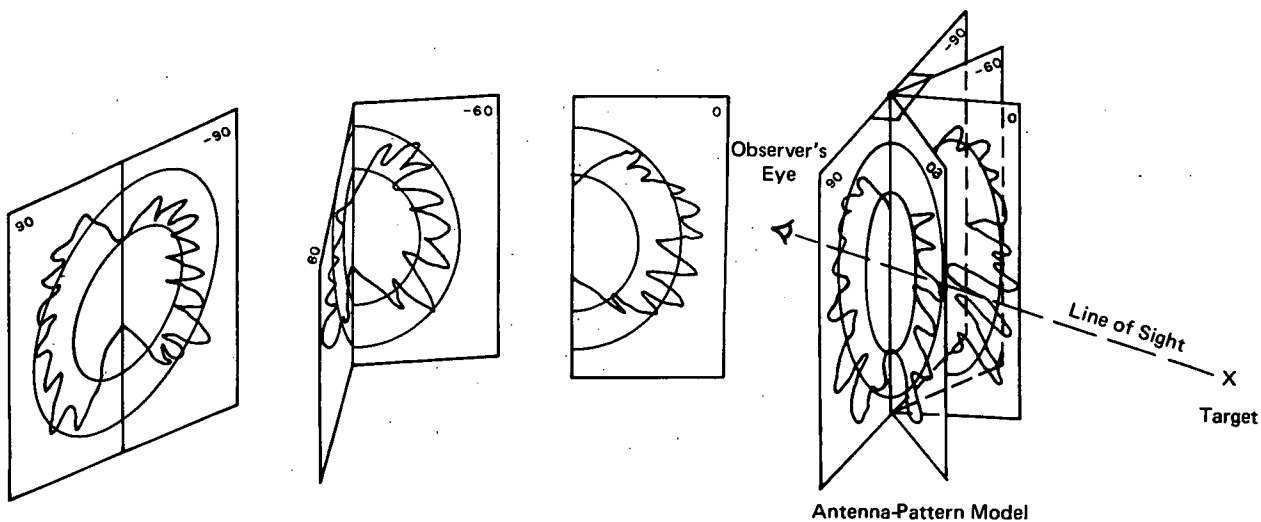


Figure 2. Three-Dimensional Antenna-Radiation Model to be Used for Setting up Nonhorizontal RF-Transmission Links

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Kennedy Space Center
Code AD-PAT
Kennedy Space Center, Florida 32899
Reference: TSP73-10426

Patent status:

NASA has decided not to apply for a patent.

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